Course Title:

Modeling Multibody Mechanical Systems with Simscape

Course Purpose:

This one-day course focuses on how to model rigid-body mechanical systems in the Simulink® environment using Simscape Multibody™ (formerly SimMechanics™).
Topics include:

- Modeling simple multibody systems
- Creating custom geometries and compound bodies
- Creating reusable models of mechanical systems
- Assembling, guiding, and verifying mechanisms
- Importing models from CAD software
- Combining Simulink, Simscape™, and Simscape Multibody blocks

Pre- requisites:

MATLAB Fundamentals course or equivalent experience using MATLAB.

Simulink for System and Algorithm Modeling course or equivalent experience using Simulink.

Modeling Physical Systems with Simscape course or equivalent experience using Simscape.

Course Duration

- ✓ 1 training day
- ✓ Hours: 09:00-17:00
- ✓ Total training hours: 8

Teaching method

The course combines lectures, demonstrations and practical exercises in Simulink® and Simscape® environments, using original training books from MathWorks. The course is in Hebrew but the training materials are in English.

Products

- MATLAB
- Simulink
- Simscape
- Simscape Multibody

Training Center Systematics - Contact information:

Phone number: 03-7660111 Ext: 6 **Email:** training@systematics.co.il

Website: http://www.systematics.co.il/mathworks

Course Objective:

Introduction to Multibody Simulation

Objective: Discuss the components that make up mechanical models and how to define them in Simscape Multibody.

- Terminology
- Solids
- Coordinate frames
- Joints
- Visualization

Refining Components

Objective: Create custom and complex rigid bodies, and parameterize parts for reusable Simscape Multibody models.

- Defining geometries
- Creating compound bodies
- Specifying body interfaces
- Parameterizing bodies for reuse

Assembling Mechanisms

Objective: Define and configure kinematics of a multibody machine in Simscape Multibody.

- Reusing existing components
- Specifying degrees of freedom
- Sensing and logging simulation results
- Adding stiffness and damping to joints
- Setting initial conditions
- Guiding and verifying an assembled mechanism

Importing CAD Models

Objective: Import existing parts and mechanisms from CAD platforms into Simscape Multibody.

- Visualizing bodies with CAD geometries
- Identifying the different CAD import workflows
- Exporting from CAD software
- Importing into Simscape Multibody
- Features captured by Simscape Multibody Link

Connecting to Simscape and Simulink

Objective: Illustrate the ways that Simscape Multibody blocks can interact with Simscape and Simulink blocks.

- Adding a combustion model using Simscape
- Actuating the piston head
- Sensing constraint forces on joints
- Adding a control system for throttle
- Creating a multidomain physical model

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